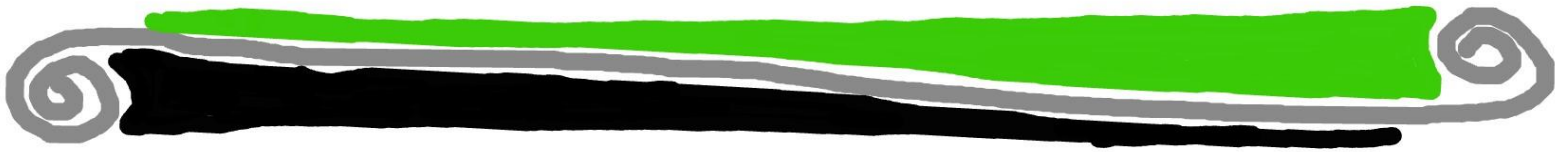
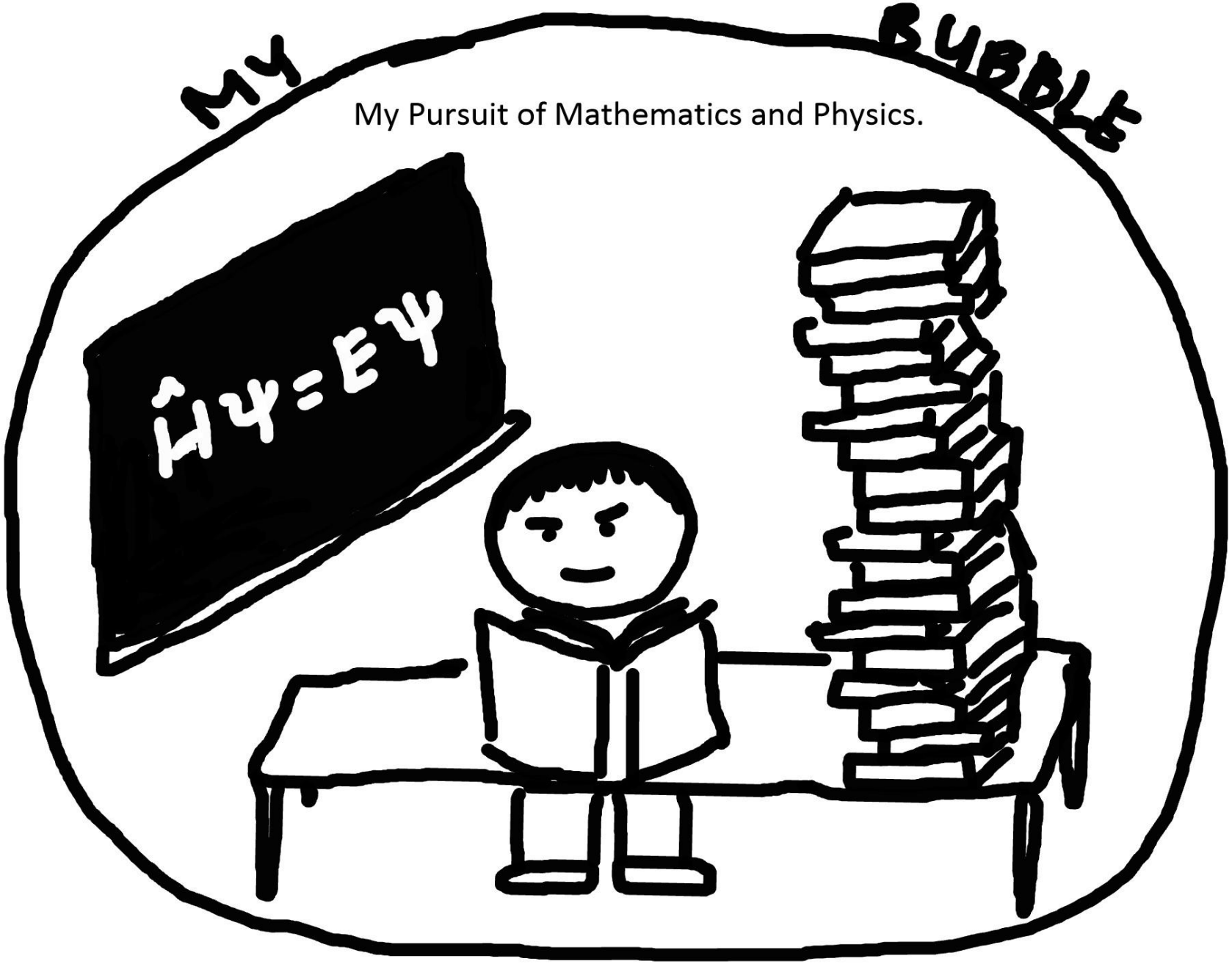
Part I

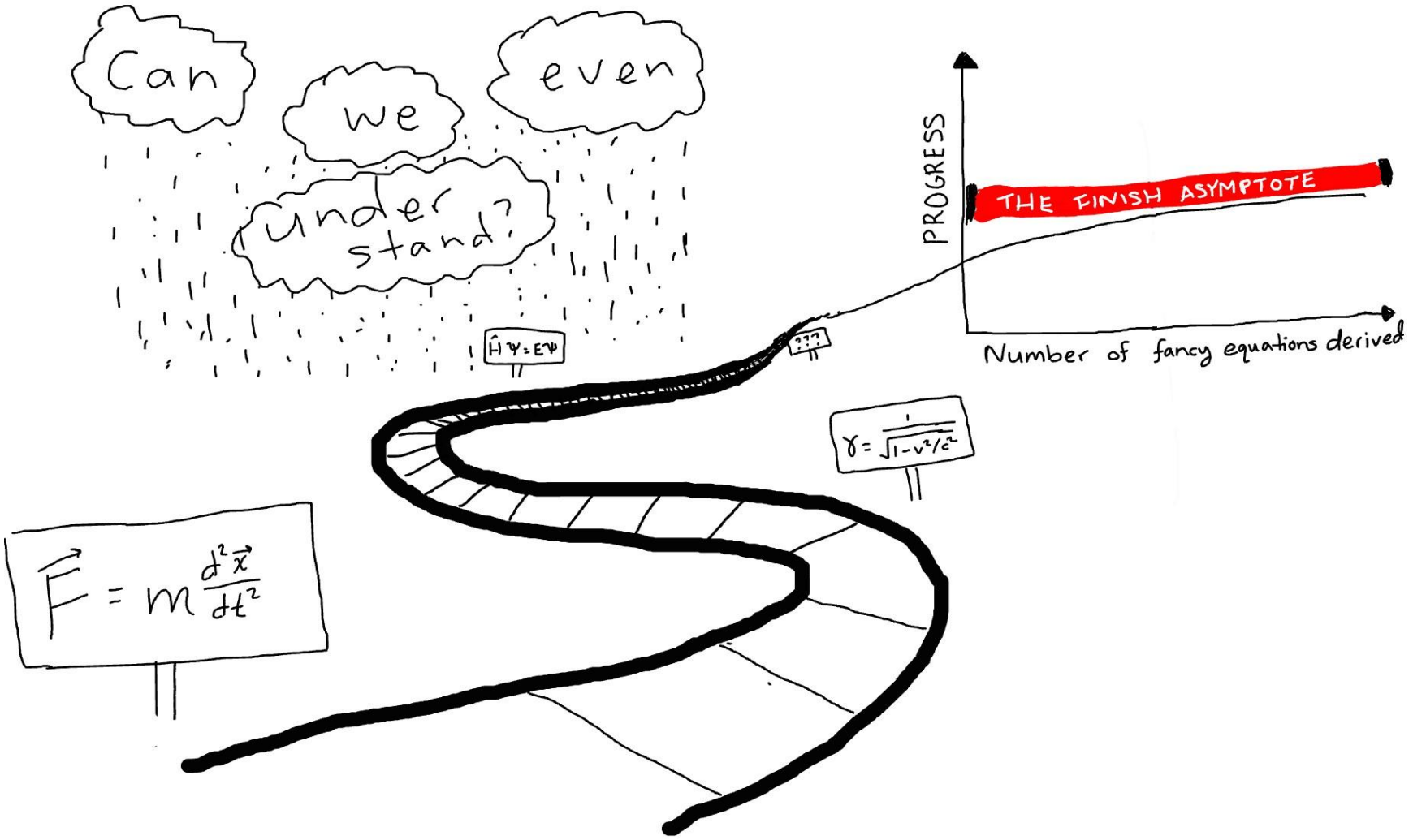
# Why we should THINK! about how we think



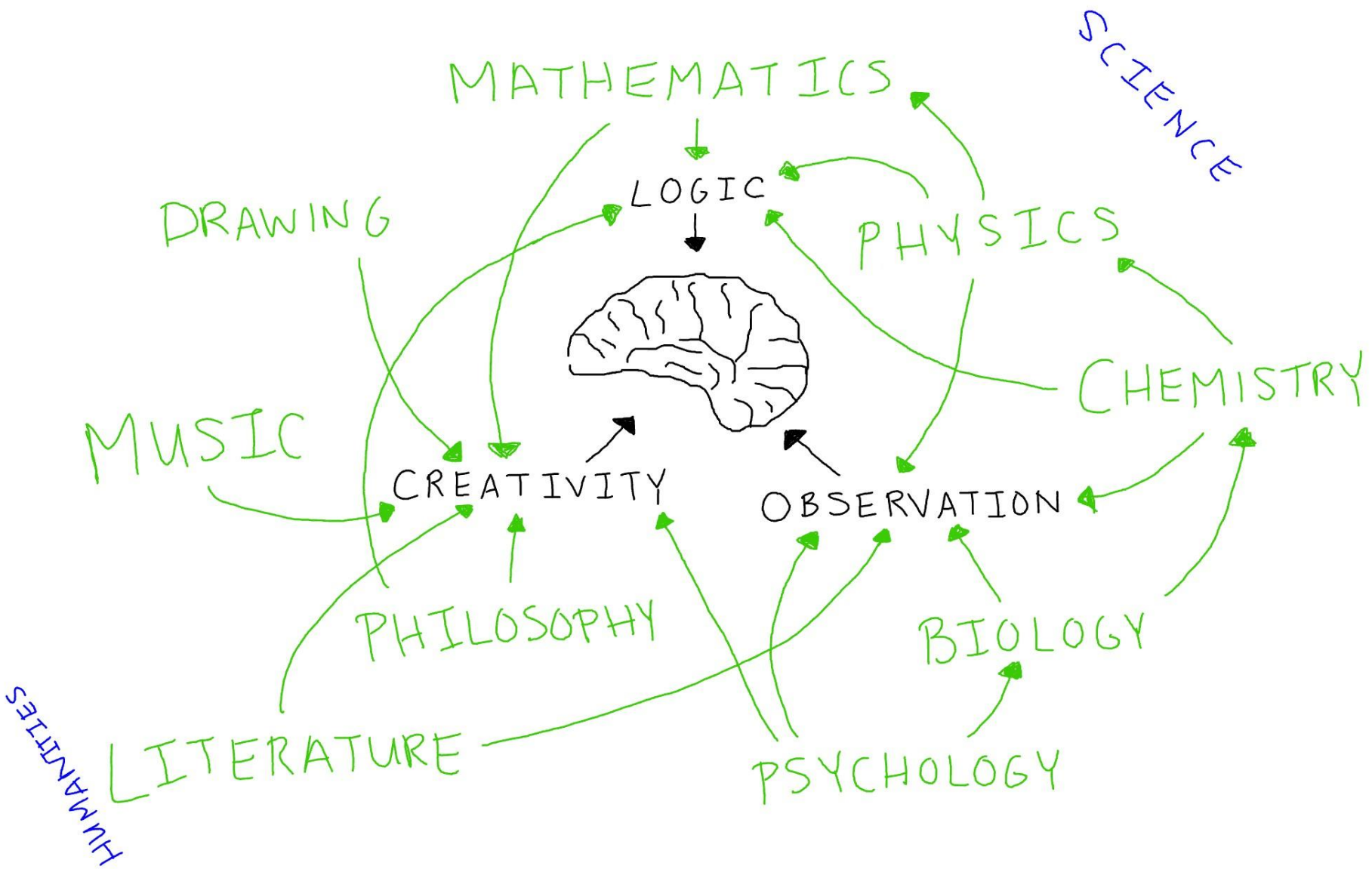
Justin P Skycak


MY
BUBBLE
My Pursuit of Mathematics and Physics.
$\hat{H}\Psi = E\Psi$

# Perpetual Progress

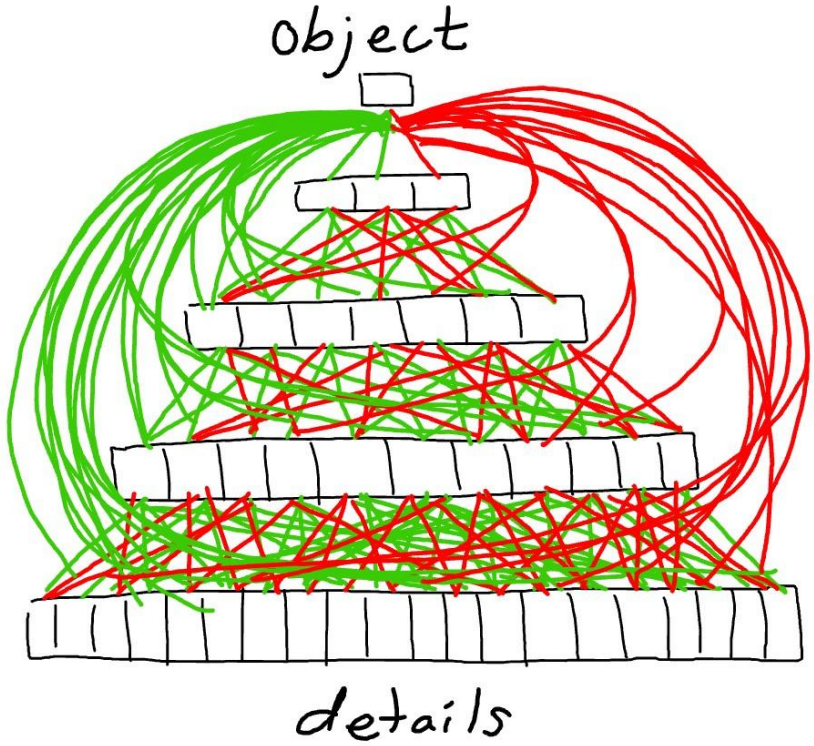


# It All Comes Back to the Brain



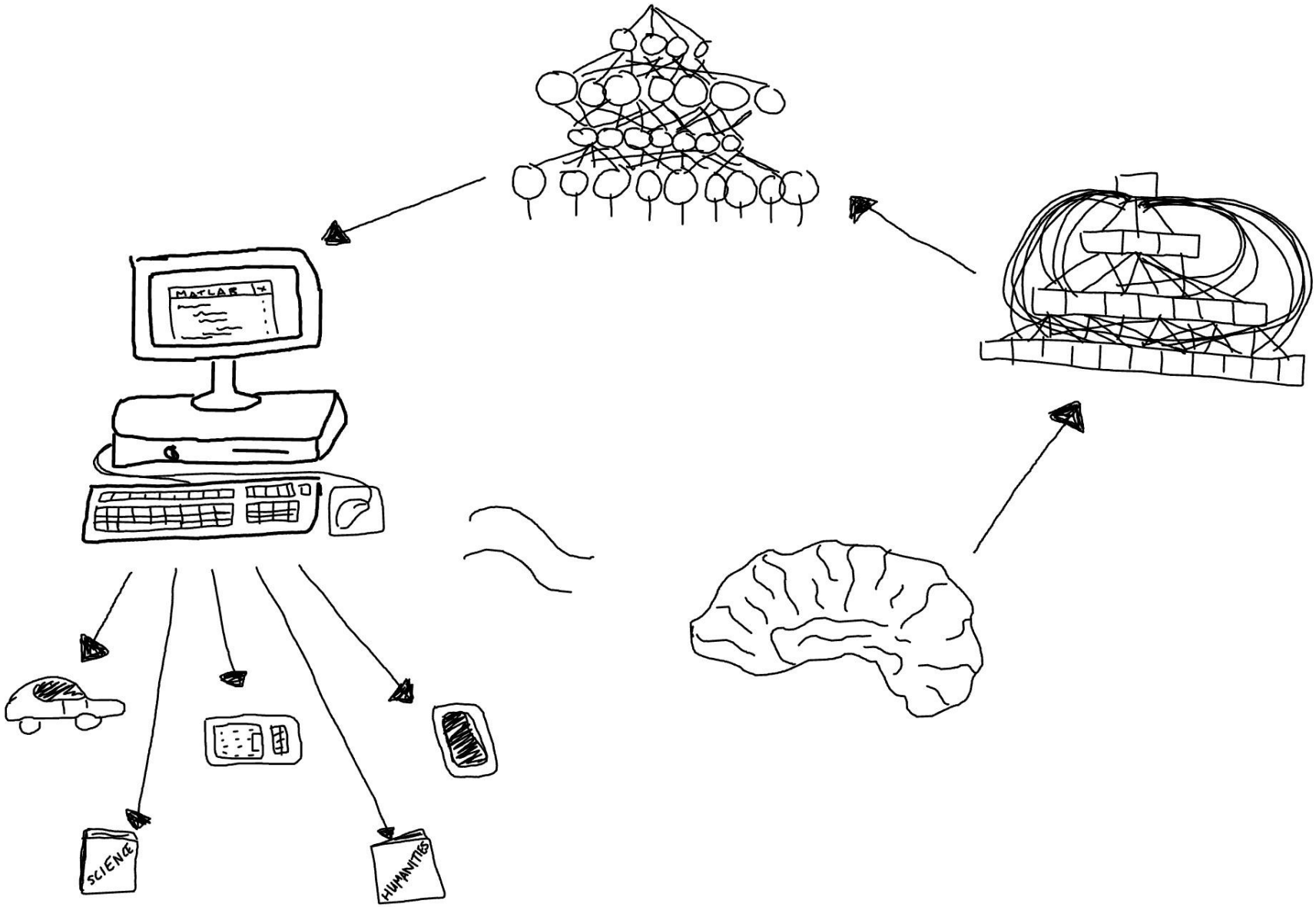
Understanding the Brain

pattern
recognition
and generation




# a single cortical algorithm?

# Implementing Intelligence



# The Big Questions

Can you train a network to philosophize?

If so, what will it think about...

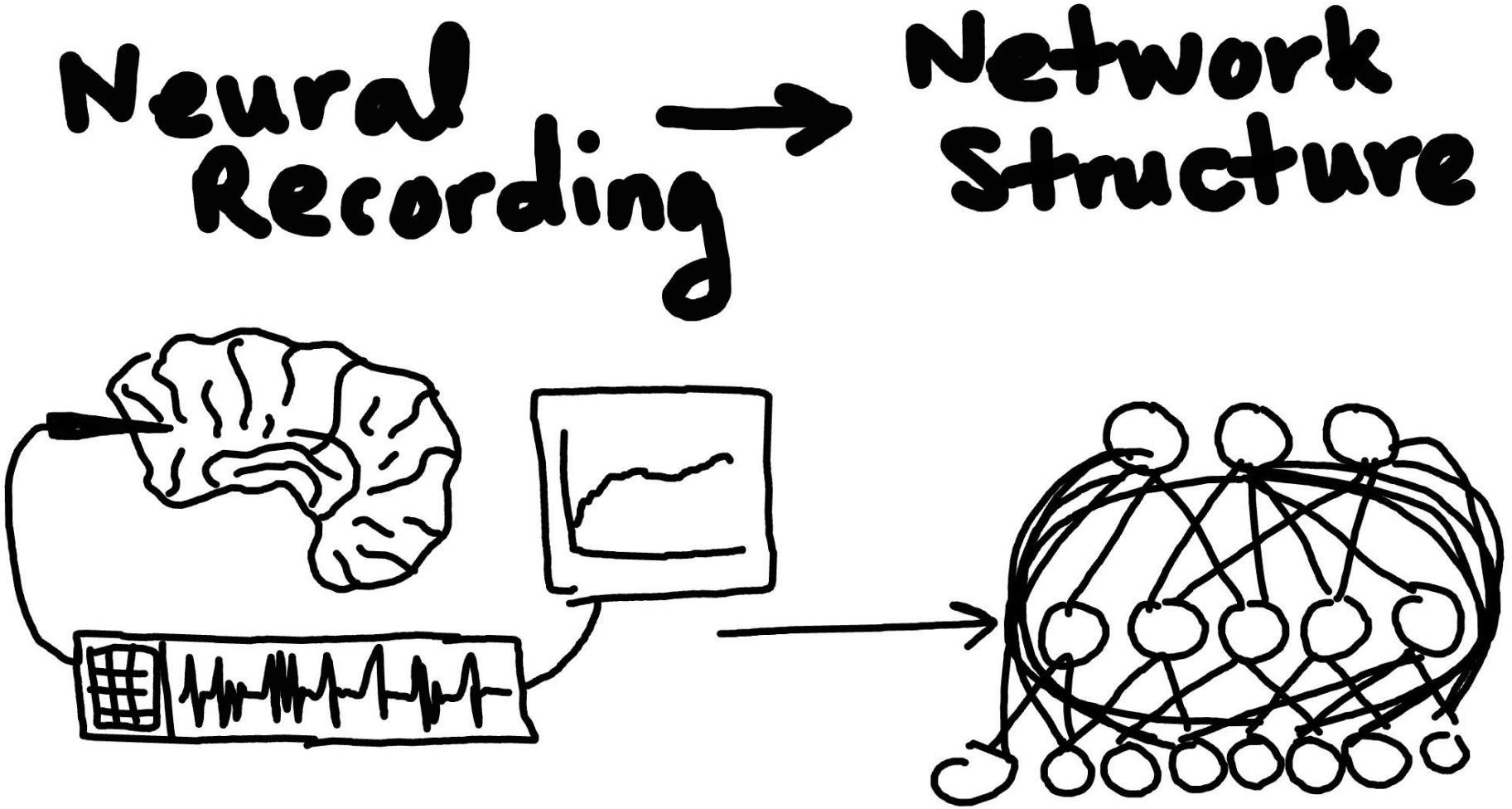
- science?
- religion?
- life?

And how will these thoughts depend on inputs and connectivity? (Nature vs. nurture?)

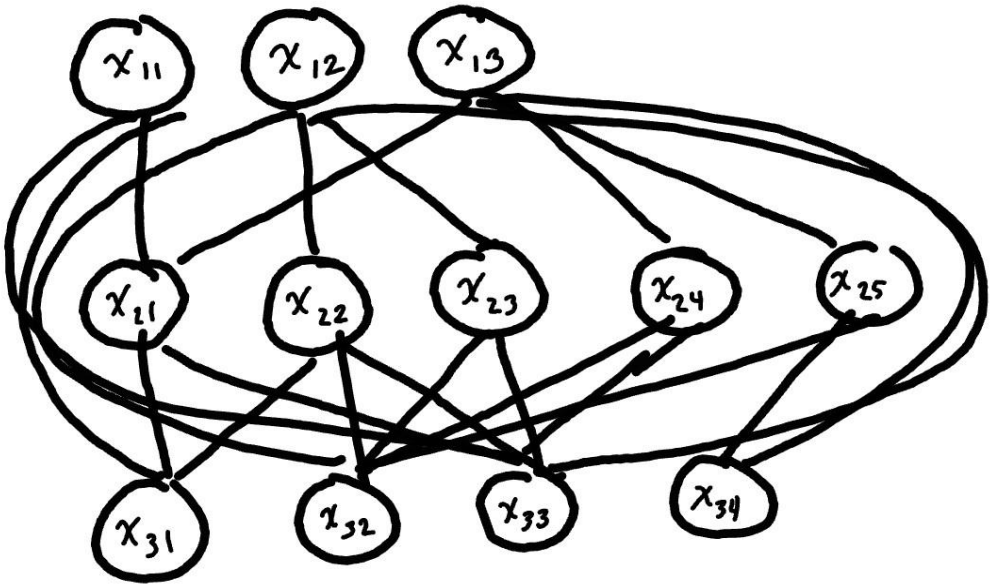
Part II

# A Neural Network Inverse Problem...

The Goal



# A Characteristic Matrix - What is it?




$$\frac{d}{dt}x = Ax$$

- inhibition
- excitation
- connectivity
- ⋮

Current Work

* $\frac{d}{dt}\chi = A\chi \Rightarrow x_{ij}(t) = c_{ij}^{1} e^{\lambda_1 t} + c_{ij}^{2} e^{\lambda_2 t} + \cdots + c_{ij}^{n} e^{\lambda_n t}$

  where $\lambda_k$ are eigenvalues of A.

* Given $\lambda_k$, $c_{ij}^{k}$ can be fit and thus A can be recovered with low error

* But, experimentally, $\lambda_k$ unknown. Approximations of $x_{ij}(t)$ using arbitrary constants for $\lambda_k$ unsuccessful.

* Regularization, extreme-value statistics, ...